

Acute and Subacute Tonsillomycoses

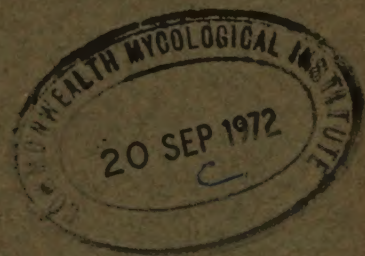
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ACUTE AND SUBACUTE TONSILLOMYCOSES.

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SOME years ago one of us called attention to the frequency of tonsillar affections of mycotic origin in tropical countries. During the war we noted that such conditions were comparatively frequent in various parts of the Continent and the near East. Since 1918 we have been on the look-out for these affections in this country and we have come to the conclusion that they are not at all rare. Clinically they may be classified into two groups: (1) the chronic forms; (2) the acute and subacute forms.

The chronic types are represented by the various forms of actinomycosis (nocardiasis, streptothricosis) and pseudo-actinomycosis, but these conditions, though rare, have been known for years and therefore we will not touch upon them, except to note that in the Tropics we have observed a case of tonsillo-mycosis with black granules due to *Nocardia nigra* (Castellani 1912); and we would also call attention to the comparative frequency of a *chronic granular nocardiasis* of the crypts, which is at times the starting-point of tonsillar calculi. The affection, which is not new, but which is little known, runs a chronic course and is not painful. The patient often does not come to consult the doctor because of sore throat, but because of the unpleasant odour of the breath. Yet on examining the throat small whitish-yellowish spots will be seen on the tonsils; these spots are in reality the surface portion of the granules contained in the crypts, and may be extracted with more or less ease. These bodies when crushed emit a very offensive odour; under the microscope they are sometimes seen to consist of masses of nocardia-like organisms, at other times of masses of leptothrix; in certain cases both nocardial fungi and leptothrix are seen, as well as various bacteria, and even protozoa such as amœbæ and flagellates. The *Nocardia* fungi present are very difficult to grow. After several years the masses in the crypts may become calcified, and real calculi may be formed, which sometimes form the starting point of some very severe inflammation.

ACUTE TONSILLOMYCOSES.

Very little attention has so far been paid to acute and subacute tonsillo-mycoses, though they are of practical importance as they may often simulate diphtheria. The following is an ætiological classification of these acute and subacute types:—

(1)	Due to fungi of the genus <i>Monilia</i>	Tonsillo-moniliasis
(2)	" " " <i>Saccharomyces</i>	Tonsillo-saccharomyces
(3)	" " " <i>Cryptococcus</i>	Tonsillo-cryptococcosis
(4)	" " " <i>Oidium</i>	Tonsillo-oidiosis
(5)	" " " <i>Hemispora</i>	Tonsillo-hemisporosis

Without entering into too many botanical details, it may be of practical advantage to give briefly certain characters of the above genera.

Genus Monilia, Persoon, 1797.—The original definition by Persoon is "*Stipitata aut effusa byssoidea, fila moniliformis articulata*," and Saccardo and other botanists state that these fungi are characterized by the sporophores being simple or sub-simple, and producing by constriction at their extremities a chain of large lemon-shaped conidia, often provided with a disjunction apparatus. No asci and no ascospores are present. The general tendency at the present time, however, thanks to the work of Pinoy, is to extend the term "*Monilia*" so as to include all those organisms of the family *Oosporaceæ* Saccardo 1886, the vegetative body (thallus) of which in its parasitic life (*in situ*, in the lesions) appears as a mass of mycelial threads and free budding forms, some of the mycelial filaments being long and branched, and of rather large size, and often presenting arthrospores. In the saprophytic life (cultures on the usual solid laboratory media) mostly roundish or oval budding yeast-like cells are seen, while mycelial filaments are very scarce or absent, and when present they are rather short and consist only of a few articles. *Monilia* fungi very often ferment glucose and other carbohydrates with production of gas. Therefore, from a practical point of view these fungi are characterized principally by the following features: In their parasitic life in the human lesions the vegetable body (thallus) is composed of mycelial threads of rather large size showing arthrospores and numerous free, oval, or roundish budding yeast-like elements; in cultures, especially on solid media, mostly roundish or oval budding cells are seen, while mycelial filaments are scarce or absent. Asci and ascospores are absent.

For practical purposes monilias may be conveniently classified according to some of their biochemical characteristics as follows:—

(1) Production of gas in glucose only	<i>Monilia balcanica</i> Cast. group
(2) Gas produced in glucose and lævulose only	<i>Monilia krusei</i> Cast. group
(3) Gas produced in glucose, lævulose and maltose	<i>Monilia pinoy</i> Cast. group
(4) Gas produced in glucose, lævulose, maltose and galactose	<i>Monilia metalondinensis</i> Cast. group
(5) Gas produced in glucose, lævulose, maltose and galactose	<i>Monilia tropicalis</i> Cast. group
(6) Gas produced in glucose, lævulose and saccharose	<i>Monilia guillermonti</i> Cast. group
(7) Gas produced in glucose, lævulose, saccharose, galactose and inulin	<i>Monilia macedoniensis</i> Cast. group
(8) Gas produced in dextrin in addition to other sugars	<i>Monilia pseudolondinensis</i> Cast. group
(9) Gas produced in lactose in addition to other sugars	<i>Monilia pseudotropicalis</i> Cast. group
(10) Absence of gas fermentation in any sugar	<i>Monilia zeylanica</i> Cast. group

A more detailed classification of the genus *Monilia* may be found in Castellani and Chalmers' "Manual of Tropical Medicine," p. 1079.

Saccharomyces, Meyen.—The characters of these fungi are identical with those of the genus *Monilia*, except that asci and ascophores are present in old cultures.

Genus Oidium, Link (*sensu stricto*).—This genus is morphologically closely allied to *Monilia*, but mycelial threads are much more abundant both in the lesions and in the cultures, and budding yeast-like cells are rare. Fungi of this genus may occasionally induce an acid fermentation, but never produce gas. There is no doubt that the original thrush fungus, *Oidium albicans* Robin, 1895, is not an *oidium* but a *monilia*.

Genus Hemispora, Villemin.—The mycelium is very abundant. Some

mycelial hyphæ become differentiated, forming terminal ampulliform structures called "protoconidia." The protoconidium after a time divides into several segments called "deuteroconidia," which are the true reproduction spores.

CLINICAL SYMPTOMS.

Tonsillomoniliasis.—The onset is generally abrupt with general malaise, fever, and difficulty in swallowing. On inspection of the throat, in most cases, the tonsils are seen to be covered with creamy white patches which at times extend to the soft palate, the pharynx and the larynx. Diphtheria is often suspected, but the microscopical and cultural examination of the patches clears up the diagnosis. One of us, however, has seen cases of mixed infection, diphtheria and moniliasis in the Tropics. The prognosis is generally favourable but not always. The treatment consists in local applications of glycerine of borax, and, most efficacious, a carbolic or a chlorine spray. Small doses of phenazone or aspirin may be given internally.

Illustrative Cases.

Case I.—History: On August 5, 1921, Pensioner N. suffered from tonsillitis with temperature 102° F., rapid pulse and prostration. On the tonsils and fauces there was a white, easily detached, membrane. Neither in the direct smear nor on the culture were diphtheria bacilli found. In the direct smear, made at the bedside, were a large number of monilia. From cultures on Löffler's medium and glucose-agar, *Monilia* was grown at 37° C., and isolated in pure culture. The patient made a good recovery after the exhibition of a chlorine gargle. No antitoxin was given.

Biological reactions: The monilia isolated gave the following reaction: (1) glucose, A. and G.; (2) lævulose, A. and G.; (3) maltose, A. and G.; (4) galactose, A. and G.; (5) saccharose, nil; (6) lactose, nil; (7) inulin, nil; (8) litmus milk, nil. The *Monilia* biologically corresponds to *Monilia metalondinensis* (Castellani, 1916).

Intravenous inoculation of isolated *Monilia*: An emulsion of the *Monilia* was made from a glucose-agar slope and 1 c.c. of a white opaque emulsion was injected into an ear vein of a rabbit. In five days' time the animal died and cultures of the *Monilia* were obtained from the heart blood, lungs, liver, spleen and kidney.

Naked-eye appearance of organs: In the lungs there were areas of congestion but there was no pneumonia. Both kidneys were greatly enlarged. The capsules stripped readily and showed the surface white and granular. On section the cortex was whitish. This was due to white specks, none larger than a pin's head, closely set together. There were a few discrete specks in the medulla which otherwise showed little change to the naked eye. There was no change of note to the naked eye in any other of the organs.

Microscopic appearance of kidney: Microscopic sections showed the *Monilia* scattered throughout the substance of the kidney, but mostly in the cortex. A few lay singly but for the most part they were small groups and surrounded by small round cells. The glomeruli were not greatly affected. The convoluted and other tubules were distinctly degenerated and many of them crushed owing to the presence of groups of *Monilia*. The collecting tubules were less affected, but in their lumen were many red blood corpuscles and small white cells. The interstitial tissue was not increased. Between the tubules, however, especially in the medulla, there was a considerable amount of homogeneous matrix, staining pink with eosin. In the medulla the groups of *Monilia* were confined mainly to the periphery. In the clusters there was no caseation, no increase of fibrous tissue and there were no giant cells present.

The organism isolated from the heart blood of this rabbit was injected in a similar manner into another and in the same manner the second rabbit died in five days. At the autopsy the naked-eye appearances of the organs was in every way identical with those described above, as were also the microscopic pictures of the kidneys. The same *Monilia* was isolated from its heart blood and from the organs.

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Case II.—Singhalese girl, aged about 11, admitted to the Infectious Diseases Hospital of Colombo with the diagnosis of diphtheria. There were white patches on the tonsils, uvula, and soft palate. The temperature was rather high (102° F.) ; the pulse frequent and of low pressure. There was swelling of the angle of the jaw. The child developed symptoms of broncho-pneumonia and died three days after admission. (Anti-diphtheria serum was given twice by the physician in charge of the hospital.) The microscopical and bacteriological examination of the patches for the Klebs-Löffler bacillus, carried out with the usual technique, serum-media, &c., being used, remained negative. No bacteria of any kind were seen in the specimens directly taken from the patches, but numerous mycelial and conidial elements of a fungus were present. On serum and glycerine agar media no colonies of diphtheria or other bacteria. The fungus had all the biochemical characters of *Monilia tropicalis*, Cast.

Case III.—A young European lady, aged 22, became suddenly ill with sore throat at one of the Colombo hotels. Her medical attendant suspected diphtheria, and called one of us to see her in consultation. When examined her temperature was 101° F., pulse 98 ; she complained of difficulty and pain in swallowing, both tonsils and uvula were covered with white creamy patches. Preparations made from the patches revealed an enormous number of yeast-like organisms and a few cocci, while no bacilli of any kind were present. This, of course, was sufficient to exclude diphtheria. On glucose agar tubes a fungus grew in pure culture with all the characters of a *Monilia*. This *Monilia* rendered milk slightly acid, and then decolorized it completely ; it did not liquefy serum or gelatine. On serum it induced a narrow zone of black discoloration all round the growth.

Tonsillo-oidiosis.—The clinical symptoms are identical with those observed in tonsillo-moniliasis. The oïdium so far found in these cases is *Oïdium matalense* Castellani.

Illustrative Case.—European, aged 25, has been several years in Ceylon. In November, 1914, was taken ill with severe sore throat, difficulty in swallowing, and high fever (104° F.). When seen by one of us, twelve hours after onset, both tonsils were covered with a white exudation, but not the uvula. The microscopical and bacteriological examination showed absence of the diphtheria bacillus, while a fungus was grown with the botanical characters of an oïdium. Further investigation showed it to be very similar to *Oïdium matalense*.

Tonsillo-hemisorosis.—The clinical symptoms are somewhat different from tonsillo-moniliasis. The onset is as acute, but the general and local symptoms do not disappear so rapidly, the patches are not creamy, they are greyish brown, or even greyish-yellowish, and are very resistant to treatment. The fungus found is a *Hemispora*, usually *Hemispora rugosa* Cast.

Case I.—European planter, admitted to the Kandy Hospital on May 2, 1913. The illness had started two weeks previously. Temperature on admission 101° F. Complained of severe pains in throat and difficulty in swallowing. Flushed face ; felt extremely weak and exhausted. Voice thick and nasal. Swallowing painful and difficult. Fluid regurgitated through nostrils. There was a profuse flow of saliva. The muscles of the neck were rigid, submaxillary glands enlarged and painful. The patient was unable to open the mouth wide. Tongue thickly coated and dry ; soft palate swollen. Greyish membranes were present on the left tonsil, left anterior pillar, and soft palate. Diphtheria antitoxin (2,000 units) injected the same day into the flank and spray of hydr. perox. prescribed. During the next four days the general condition improved, but the white-greyish membranes in the cleft between the left tonsil and the left anterior pillar were still very evident. Nine days after admission there was still a small whitish patch visible, but the patient felt quite well and was discharged the following day. In smears made from swabs taken for examination no bacilli were seen, a few cocci were present, and numerous large mycelial segments of a fungus. Serum tubes and glycerine agar tubes were inoculated as usual, and gave the presence of

	Glucose	Lævulose	Maltose	Galactose	Saccharose	Lactose	Mannite	Dulcite	Dextrin	Raffinose	Arabinose	Adonite	Inulin	Sorbit	Starch	Glycerine	Inosite	Salicine	Amygdalin	Isodulcite	Erythrite	Gelatine	Serum	Litmus milk	Colour of growth on agar
<i>Monilia zeylanica</i> , Cast.	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	Yellowish
" <i>balcanica</i> , Cast.	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	White
" <i>parabalcanica</i> , Cast.	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	"
" <i>krusei</i> , Cast. ...	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	"
" <i>parakrusei</i> , Cast.	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	"
" <i>pinoyi</i> , Cast. ...	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	"
" <i>nabarroi</i> , Cast.	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	"
" <i>metalonidensis</i> , Cast.	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	"
" <i>alba</i> , Cast. ...	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	"
" <i>albicans</i> , Robin.	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	"
" <i>tropicalis</i> , Cast.	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	"
" <i>metatropicalis</i> , Cast.	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	"
" <i>rhoi</i> , Cast. ...	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	"
" <i>guillermondi</i> , Cast. ...	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	"
" <i>macedoniensis</i> , Cast.	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	"
" <i>macedoniensisoides</i> , Cast.	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	"
" <i>parachalmeri</i> , Cast.	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	"

G = gas; O = absence of gas; C = presence of clot; + = positive; s = slight.

mycelial threads, also several sugar agars. The serum and glycerine agar tubes did not show any growth of the diphtheria bacillus; instead there was growth of a fungus with a peculiar crinkled surface which one of us had found previously in 1909 in a case of bronchitis. Being uncertain of its classification it was placed temporarily in the genus *Monilia*, and called *Monilia rugosa*. It was later sent to Professor Pinoy, of the Pasteur Institute, who, after a long botanical investigation, came to the conclusion that the organism belonged to the genus *Hemispora*. The correct name of the fungus became therefore *Hemispora rugosa* Cast.

Case II.—Mrs. N. B. came to consult one of us in September last year. She was complaining of sore throat which had begun three weeks ago and she had been treated with various gargles. There was a large greyish-yellowish patch on the right tonsil. The microscopical and cultural examination revealed presence of a *Hemispora*. The local condition healed after repeated applications of iodine. It is interesting to note that soon after, she developed signs of bronchitis and the same fungus was found in the sputum.

CONCLUSIONS.

Acute and subacute affections of the tonsils of mycotic origin are frequently met with in the Tropics, and are not at all rare on the Continent of Europe and in this country. Most of the cases we have observed were due to fungi of the genus *Monilia*, a few to fungi of the genus *Oidium* and of the genus *Hemispora*.

Cases of acute tonsillomycosis generally terminate favourably, but not constantly. These conditions have a certain practical importance, as they may simulate diphtheria, and are not infrequently treated as such.

